

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: )  
)  
Dennis W. PRATHER et al. )  
) Group Art Unit: Unassigned  
Serial No.: Unassigned (national stage application )  
of International Application No. PCT/US03/01384 ) Examiner: Unassigned  
)  
Filed: July 19, 2004 )  
)  
For: ELECTRO-OPTICAL SWITCHING )  
USING COUPLED PHOTONIC )  
CRYSTAL WAVEGUIDES )

Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

Sir:

**INFORMATION DISCLOSURE STATEMENT UNDER 37 C.F.R. § 1.97(b)**

Pursuant to 37 C.F.R. §§ 1.56 and 1.97(b), Applicants bring to the attention of the Examiner the documents listed on the attached PTO-1449. This Information Disclosure Statement is being filed concurrently with the above-referenced application. Copies of the listed documents are attached. Applicants respectfully request that the Examiner consider the listed documents and indicate that they were considered by making appropriate notations on the attached PTO-1449.

This submission does not represent that a search has been made or that no better art exists and does not constitute an admission that each or all of the listed documents are material or constitute "prior art." If the Examiner applies any of the documents as prior art against any claim in the application and Applicants determine that the cited documents do not constitute

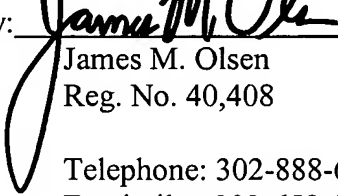
"prior art" under United States law, Applicants reserve the right to present to the office the relevant facts and law regarding the appropriate status of such documents. Applicants further reserve the right to take appropriate action to establish the patentability of the disclosed invention over the listed documents, should one or more of the documents be applied against the claims of the present application.

If there is any fee due in connection with the filing of this Statement, please charge the fee to our Deposit Account No. 03-2775.

Respectfully submitted,

CONNOLLY BOVE LODGE & HUTZ LLP

Date: July 19, 2004

By:   
James M. Olsen  
Reg. No. 40,408  
Telephone: 302-888-6256  
Facsimile: 302-658-5614

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

|  |   |    |   |                          |                          |
|--|---|----|---|--------------------------|--------------------------|
| Substitute for form 1449A/PTO<br><br><b>INFORMATION DISCLOSURE<br/>STATEMENT BY APPLICANT</b><br><br>(use as many sheets as necessary) |   |    |   | <b>Complete if Known</b> |                          |
|  |   |    |   | Application Number       | Unassigned               |
|  |   |    |   | Filing Date              | July 19, 2004            |
|  |   |    |   | First Named Inventor     | Dennis W. PRATHER et al. |
|  |   |    |   | Group Art Unit           | Unassigned               |
|  |   |    |   | Examiner Name            | Unassigned               |
|  |   |    |   | Attorney Docket Number   | 131*288                  |
| Sheet  | 1 | of | 3 |                          |                          |

| U.S. PATENT DOCUMENTS |                       |   |                                |  |  |
|-----------------------|-----------------------|---|--------------------------------|--|--|
| Examiner Initials*    | Cite No. <sup>1</sup> | Document Number<br>Number-Kind Code <sup>2</sup> (if known) | Publication Date<br>MM-DD-YYYY | Name of Patentee or Applicant<br>of Cited Document | Pages, Columns, Lines,<br>Where Relevant<br>Passages or Relevant<br>Figures Appear |
|                       |                       | 2001/0026668  | 10-04-2001                     | Yamada   |  |
|                       |                       | 2002/0021878  | 02-21-2002                     | Allan et al.                                       |  |
|                       |                       | 6,512,866   | 01-18-2003                     | Fan et al.   |  |
|                       |                       | 6,542,682   | 04-01-2003                     | Cotteverte et al.                                  |  |
|                       |                       | 6,618,535   | 09-09-2003                     | Reynolds   |  |

| FOREIGN PATENT DOCUMENTS |                       |  |                                |  |  |                |
|--------------------------|-----------------------|--|--------------------------------|--|--|----------------|
| Examiner Initials*       | Cite No. <sup>1</sup> | Foreign Patent Document<br>Country Code <sup>3</sup> -Number <sup>4</sup> -Kind Code <sup>5</sup> (if known) | Publication Date<br>MM-DD-YYYY | Name of Patentee or<br>Applicant of Cited Document | Pages, Columns, Lines,<br>Where Relevant<br>Passages or Relevant Figures<br>Appear | T <sup>6</sup> |
|                          |                       | JP 2001-281480   | 10-10-2001                     |  |  |                |

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant

<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> See attached Kinds Codes of USPTO Patent Documents at [www.uspto.gov](http://www.uspto.gov) or MPEP 901.04. <sup>3</sup> Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>4</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the application number of the patent document. <sup>5</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. <sup>6</sup> Applicant is to place a check mark here if English language Translation is attached.

| OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS |                       |  |  |
|---|-----------------------|--|--|
| Examiner Initials*                                | Cite No. <sup>1</sup> | Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, page(s), volume-issue number(s), publisher, city and/or country where published. |  |
|   |                       | A. Yariv et al., <i>Optical Waves in Crystals</i> (1984).  |  |
|   |                       | R.A. Soref et al., "Electrooptical Effects in Silicon," <i>IEEE Journal of Quantum Electronics</i> , vol. QE-23, No. 1, pp. 123-129 (Jan. 1987).   |  |
|   |                       | E. Yablonovitch, "Inhibited Spontaneous Emission in Solid-State Physics and Electronics," <i>Physical Review Letters</i> , vol. 58, no. 20, pp. 2059-2062 (May 1987).  |  |
|   |                       | S. John, "Strong Localization of Photons in Certain Disordered Dielectric Superlattices," <i>Physical Review Letters</i> , vol. 58, no. 23, pp. 2486-2489 (June 1987).   |  |
|   |                       | M. Plihal et al., "Phononic band structure of two-dimensional systems: The triangular lattice," <i>Physical Review B</i> , vol. 44, no. 16, pp. 8565-8571 (Oct. 1991).   |  |
|   |                       | A. Taflov, <i>Computational Electrodynamics: The Finite-Difference Time-Domain Method</i> (1995).  |  |
|   |                       | R.A. Soref et al., "Proposed N-Wavelength M-Fiber WDM Crossconnect Switch Using Active Microring Resonators," <i>IEEE Photonics Technology Letters</i> , vol. 10, no. 8, pp. 1121-1123 (Aug. 1998).  |  |
|   |                       | O. Painter et al., "Defect modes of a two-dimensional photonic crystal in an optically thin dielectric slab," <i>Journal Optical Society of America</i> , vol. 16, no. 2, pp. 275-285 (Feb. 1999).   |  |

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> Applicant is to place a check mark here if English language Translation is attached.

|                    |  |   |  |
|--------------------|--|---|--|
| Examiner Signature |  | Date Considered   |  |
| Form PTO 1449      |  | Patent and Trademark Office – U.S. Department of Commerce |  |

|  |   |    |   |                          |                          |
|--|---|----|---|--------------------------|--------------------------|
| Substitute for form 1449A/PTO<br><br><h2 style="text-align: center;">INFORMATION DISCLOSURE<br/>STATEMENT BY APPLICANT</h2> <p style="text-align: center;">(use as many sheets as necessary)</p> |   |    |   | <b>Complete if Known</b> |                          |
|  |   |    |   | Application Number       | Unassigned               |
|  |   |    |   | Filing Date              | July 19, 2004            |
|  |   |    |   | First Named Inventor     | Dennis W. PRATHER et al. |
|  |   |    |   | Group Art Unit           | Unassigned               |
|  |   |    |   | Examiner Name            | Unassigned               |
|  |   |    |   | Attorney Docket Number   | 131*288                  |
| Sheet  | 2 | of | 3 |                          |                          |

|  |  |  |  |
|--|--|--|--|
|  |  | H. Kosaka et al., "Photonic crystals for micro lightwave circuits using wavelength-dependent angular beam steering," <i>Applied Physics Letters</i> , vol. 74, no. 10, pp. 1370-1372 (March 1999).   |  |
|  |  | S.G. Johnson et al., "Guided modes in photonic crystal slabs," <i>The American Physical Society, Physical Review B</i> , vol. 60, no. 8, pp. 5751-5758 (Aug. 1999).  |  |
|  |  | M. Bayindir et al., "Propagation of photons by hopping: A waveguiding mechanism through localized coupled cavities in three-dimensional photonic crystals," <i>The American Physical Society, Physical Review B</i> , vol. 61, no. 18, pp. R11855-R11858 (May 2000). |  |
|  |  | M. Bayindir et al., "Heavy photons at coupled-cavity waveguide band edges in a three-dimensional photonic crystal," <i>The American Physical Society, Physical Review B</i> , vol. 62, no. 4, pp. R2247-R2250 (July 2000).   |  |
|  |  | A. Chutinan et al., "Waveguides and waveguide bends in two-dimensional photonic crystal slabs," <i>The American Physical Society, Phys. Rev. B</i> , vol. 62, no. 7, pp. 4488-4492 (Aug. 2000).  |  |
|  |  | L.L. Liou et al., "Dielectric Optical Waveguide Coupling Analysis Using Two-Dimensional Finite-Difference In Time-Domain Simulations," <i>Microwave and Optical Technology Letters</i> , vol. 26, no. 4, pp. 234-237 (Aug. 2000).                                    |  |
|  |  | M. Lončar et al., "Waveguiding in planar photonic crystals," <i>Applied Physics Letters</i> , vol. 77, no. 13, pp. 1937-1939 (Sept. 2000).   |  |
|  |  | M. Lončar et al., "Design and Fabrication of Silicon Photonic Crystal Optical Waveguides," <i>Journal of Lightwave Technology</i> , vol. 18, no. 10, pp. 1402-1411 (Oct. 2000).  |  |
|  |  | C.J.M. Smith et al., "Low-loss channel waveguides with two-dimensional photonic crystal boundaries," <i>Applied Physics Letters</i> , vol. 77, no. 18, pp. 2813-2815 (Oct. 2000).  |  |
|  |  | D. Hermann et al., "Photonic band structure computations," <i>Optics Express</i> , vol. 8, no. 3, pp. 167-172 (Jan. 2001).   |  |
|  |  | S. Fan et al., "Waveguide branches in photonic crystals," <i>Journal Optical Society of America</i> , vol. 18, no. 2, pp. 162-165 (Feb. 2001).   |  |
|  |  | A. Sharkawy et al., "Multichannel wavelength division multiplexing with photonic crystals," <i>Applied Optics</i> , vol. 40, no. 14, pp. 2247-2252 (May 2001).   |  |
|  |  | M.L. Povinelli et al., "Emulation of two-dimensional photonic crystal defect modes in a photonic crystal with a three-dimensional photonic band gap," <i>Physical Review B</i> , vol. 64, pp. 75313-1 through 75313-8 (July 2001).                                   |  |
|  |  | M. Lončar et al., "Methods for controlling positions of guided modes of photonic-crystal waveguides," <i>Journal of the Optical Society of America</i> , vol. 18, no. 9, pp. 1362-1368 (Sept. 2001).   |  |
|  |  | M. Koshiba, "Wavelength Division Multiplexing and Demultiplexing With Photonic Crystal Waveguide Couplers," <i>Journal of Lightwave Technology</i> , vol. 19, no. 12, pp. 1970-1975 (Dec. 2001).   |  |
|  |  | A. Sharkawy et al., "Electro-optical switching using coupled photonic crystal waveguides," <i>Optical Society of America</i> , pp. 1-12 (2002).  |  |
|  |  | S. Boscolo et al., "Coupling and Decoupling of Electromagnetic Waves in Parallel 2-D Photonic Crystal Waveguides" <i>IEEE Journal of Quantum Electronics</i> , vol. 38, no. 1, pp. 47-53 (Jan. 2002).  |  |
|  |  | A. Chutinan et al., "Wider bandwidth with high transmission through waveguide bends in two-dimensional photonic crystal slabs," <i>Applied Physics Letters</i> , vol. 80, no. 10, pp. 1698-1700 (March 2002).  |  |
|  |  | D. Prather et al., "High-efficiency coupling structure for a single-line-defect photonic-crystal waveguide," <i>Optics Letters</i> , vol. 27, no. 18, pp. 1601-1603 (Sept. 2002).  |  |

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup>Applicant's unique citation designation number (optional). <sup>2</sup>Applicant is to place a check mark here if English language Translation is attached.

|                    |  |   |  |
|--------------------|--|---|--|
| Examiner Signature |  | Date Considered   |  |
| Form PTO 1449      |  | Patent and Trademark Office – U.S. Department of Commerce |  |

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

|  |   |    |   |                          |                          |
|--|---|----|---|--------------------------|--------------------------|
| Substitute for form 1449A/PTO<br><br><h2 style="margin: 0;">INFORMATION DISCLOSURE<br/>STATEMENT BY APPLICANT</h2> <p style="margin: 0;">(use as many sheets as necessary)</p> |   |    |   | <b>Complete if Known</b> |                          |
|  |   |    |   | Application Number       | Unassigned               |
|  |   |    |   | Filing Date              | July 19, 2004            |
|  |   |    |   | First Named Inventor     | Dennis W. PRATHER et al. |
|  |   |    |   | Group Art Unit           | Unassigned               |
|  |   |    |   | Examiner Name            | Unassigned               |
| Sheet  | 3 | of | 3 | Attorney Docket Number   | 131*288                  |

|  |  |  |  |
|--|--|--|--|
|  |  | D.M. Pustai et al., "Tunable photonic crystal microcavities," <i>Applied Optics</i> , vol. 41, no. 26, pp. 5574-5579 (Sept. 2002).                         |  |
|  |  | D.W. Prather et al., "Design and Applications of Photonic Crystals," <i>Handbook of Nanoscience, Engineering, and Technology</i> , pp.21-1 – 21-33 (2003). |  |

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup>Applicant's unique citation designation number (optional). <sup>2</sup>Applicant is to place a check mark here if English language Translation is attached.

|                       |  |   |  |
|-----------------------|--|---|--|
| Examiner<br>Signature |  | Date<br>Considered  |  |
| Form PTO 1449         |  | Patent and Trademark Office – U.S. Department of Commerce |  |